

Technical Note

Project Title:	Assessing the Transport Impacts of the Local Development Framework		
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1 Introduction

- 1.1 The purpose of this Note is to summarise the transport impacts in Manchester of the Local Development Frameworks (LDF). This note is one of a series of outputs from a study into the potential transport impacts of the Local Development Frameworks (LDF) in Greater Manchester.
- 1.2 The objective of the study was to investigate the potential impacts on transport networks of the LDF core spatial strategies for each of the districts in Greater Manchester. The approach involved using the land use and transport forecasting models that have been developed for the Greater Manchester area. The models assume levels of economic growth that are consistent with the Association of Greater Manchester Authorities' (AGMA) Accelerated Growth Scenario (AGS), along with development of the sites and allocations contained within the emerging Local Development Frameworks.
- 1.3 The outputs from this study will be used to inform the further development of the LDF strategies by showing how the resulting travel demand changes impose stresses on the transport network. These outputs will consider the impacts both locally and in neighbouring areas, and highlight where investment in the transport network is required to achieve the core strategy or a revision to that strategy.
- 1.4 The potential transport impacts of the LDFs across Greater Manchester are reported in the Final Report, along with a description of the methodology employed in analysing the transport impacts. This note focuses on the transport impacts in Manchester and should be read in conjunction with the Final Report.

2 Modelling Approach

- 2.1 The approach to the study has been to undertake land use and transport modelling to explore the relative impacts on land use and key transport metrics of the following:
 - underlying travel demand trends;
 - the land use allocations within the LDFs; and
 - the potential impact of new capital investment in transport via the Transport Fund.

- 2.2 In order to test the impacts of these drivers, artificial test scenarios were created and run through the models. In each of these scenarios, the level of population and employment growth over time was constrained to control totals for the Fully Modelled Area (equating roughly to the City Region area). However, the location of the population and employment growth was determined by the land use model.
- 2.3 The employment and population control total inputs were based upon the Accelerated Growth Scenario from AGMA's economic forecasting model, the Greater Manchester Forecasting Model (GMFM), and Department for Transport's TEMPRO data. The control for the Fully Modelled Area comprised the sum of the growth implied by the AGS forecasts for Greater Manchester County and the TEMPRO forecasts for the rest of the City Region area.
- 2.4 The tests that are reported within this note are outlined below:
- **Do Minimum** which assumed the levels of economic and demographic growth contained within the AGS forecasts and basic transport trends (on car ownership etc) but no additional development after 2011 and no changes to the transport network beyond schemes already committed.
 - **Greater Manchester Proposals Scenario** which added the LDF development proposals and a package of transport interventions that were planned for the Transport Fund to the assumptions for the Do Minimum Scenario.
- 2.5 The transport schemes contained within each of the scenarios are described in detail in Technical Note 1 "Transport Strategy Assumptions".
- 2.6 The reporting of the transport impacts of the LDFs concentrates on comparing the forecasts for 2011 with those for 2026, assuming that all of the LDF developments are built, but not necessarily occupied, and that the Greater Manchester Transport Fund schemes are constructed over this period. It should be noted that the overall level of population and employment growth is constrained to a fixed level over the fully modelled area as described above. The areas where this growth is located is determined by the land use model considering the available development space and the accessibility of those developments.
- 2.7 Some comparison is made with the situation where new developments and the transport schemes have not been constructed, to show the overall impact of the LDFs and the transport schemes on the demand for travel within Greater Manchester. In this case, the growth in population and employment has been catered for in already existing residential and employment buildings.

3 Land Use Inputs and Outputs

- 3.1 This section briefly outlines the inputs to the models in terms of the additional housing, office and industrial floorspace provided by the LDF developments, and goes on to summarise the change in population and employment in Manchester for the Greater Manchester Proposals Scenario between 2011 and 2026.
- 3.2 A summary of the LDF planning assumption for Manchester are provided in Table 1, and the resulting change in population and employment is shown in Table 2. These tables show that the housing floorspace inputs suggest an increase of 26% over the periods between 2011 and 2026,

with the population forecast to increase by 17%, but with the number of households forecast to increase by 31%. The LDF suggests that office floorspace provision will increase by 29% whilst industrial floorspace will decrease by 3%. The model forecasts that the impact of this additional floorspace will be an 11% increase in employment. The forecast increases in both population and employment over the period represent significant increases within the district.

Table 1 Manchester LDF Land Use Inputs

	2011	2026	Difference
Housing	19,408,010	24,546,812	26%
Office	2,369,202	3,058,146	29%
Industrial	2,589,721	2,520,248	-3%

Table 2 Manchester Population and Employment Forecasts - Greater Manchester Proposals Scenario

	2011	2026	Difference
Population	470,196	550,672	17%
Households	216,967	284,241	31%
Jobs	318,212	353,934	11%

3.3 Figure 1 shows the distribution of population changes across the district between 2011 and 2026. This shows a change in the distribution of population, with some zones seeing increases and others decreases. The majority of the population growth is forecast to occur in and around the Regional Centre, and the northern parts of the district. A number of model zones are forecast to have decreases in the level of population, particularly in the southern part of the district.

3.4 The distribution of employment change, shown in figure 2, show large forecast increases in employment in and around the Regional Centre. There are also significant increases in employment forecast in south Manchester around the airport. There are decreases in employment to the east of the Regional Centre, but elsewhere there is little change in employment levels.

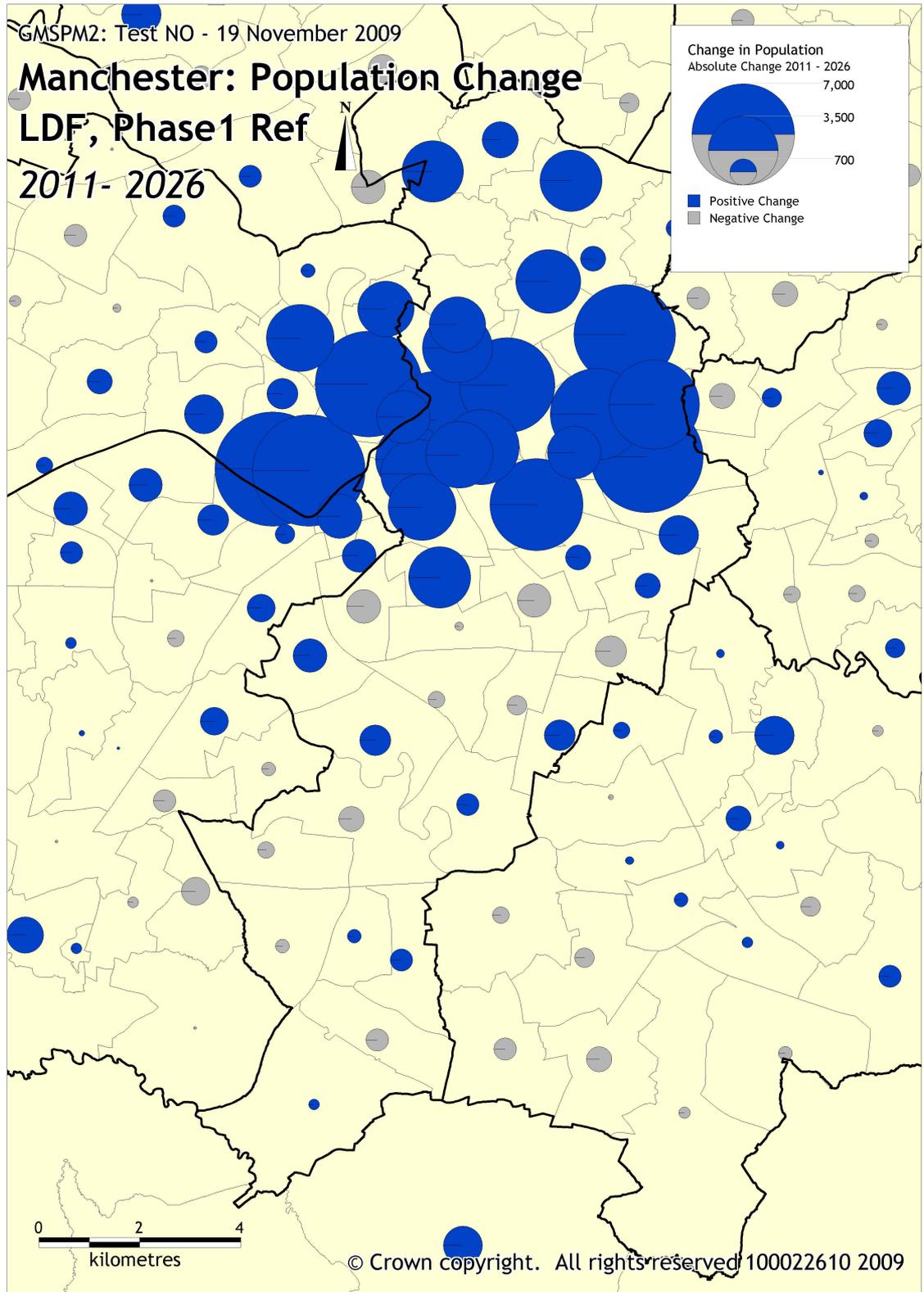


Figure 1 Manchester Population Change – Greater Manchester Proposals Scenario

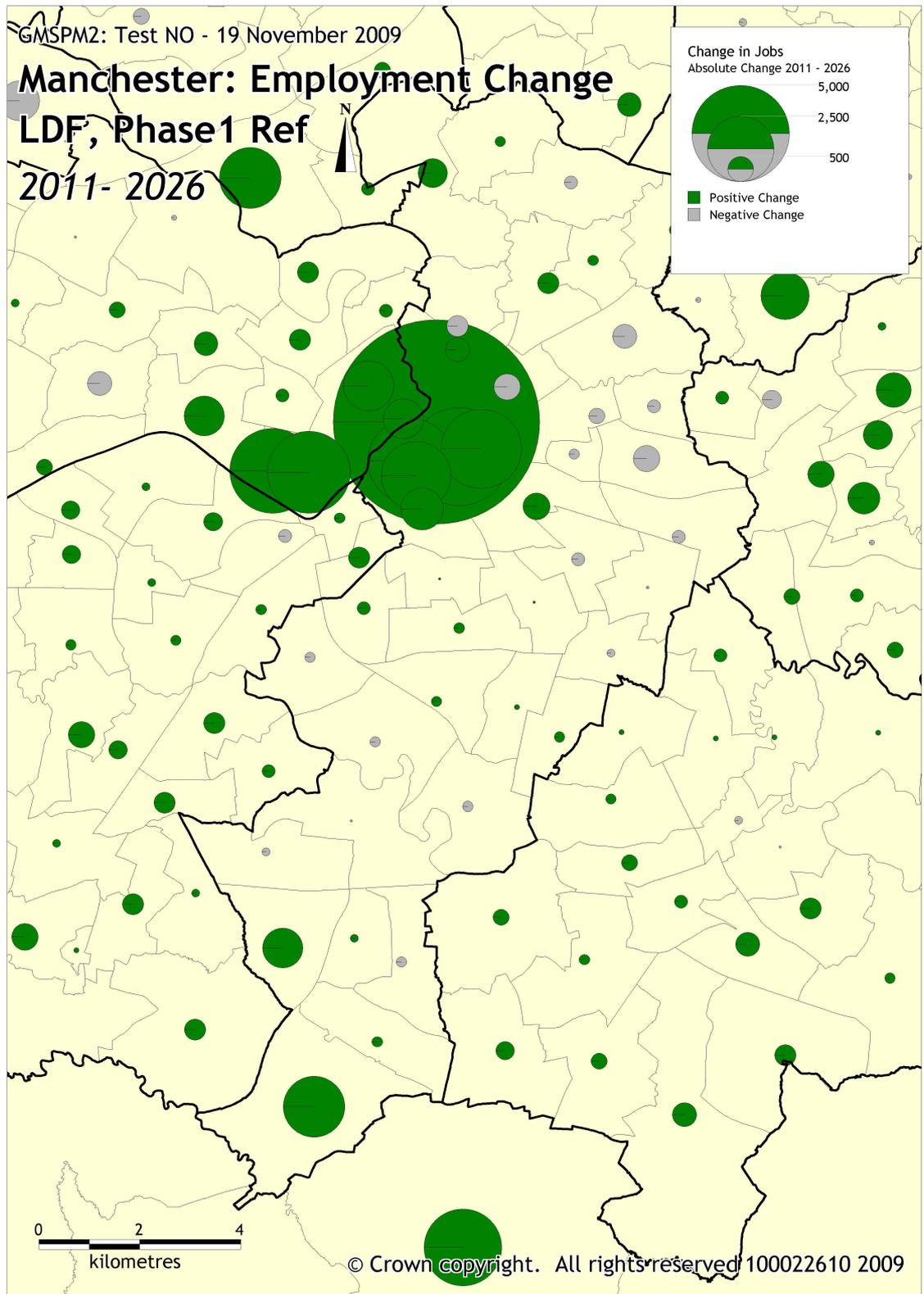


Figure 2 Manchester Employment Change - Greater Manchester Proposals Scenario

4 Transport Outputs

4.1 This section reports on the impact of the LDFs and the Transport Scenario on the transport networks over time.

Changes in Trip Making

4.2 Table 3 shows the forecast impact on the demand for travel in the Do Minimum scenario, which reflects the changes in population and employment levels, changes in car ownership, and changes in the cost of travel over time but without considering the location of new developments. Car based trips are forecast to increase by 23% for producers and 19% for attractors with overall trip making increasing by 10% between 2011 and 2026. Despite the overall increase forecast in the level of trip making, public transport, walking cycling trips are forecasts to decrease by around 3 to 4%.

4.3 The model forecasts for the Greater Manchester Proposals Scenario are shown in Table 4, which show higher level of trip making across Manchester than in the Do Minimum Scenario, particularly for public transport and walk/cycle trips. Trip making by all modes is forecast to increase over the period 2011 to 2026, which is a result of the increasing levels of population and employment, and the concentration of development in the Regional Centre which is well served by public transport. It should be noted that car trip making is increasing at a faster rate than the other modes, and therefore the car mode share for journeys is still increasing. Public transport journeys are forecast to increase by around 8%, which is a fairly significant increase and will have some impact on crowding levels.

Table 3 Change in Manchester Home Based Trip Productions and Attractions – Do Minimum

	2011	2,026	Difference
Productions			
Car	301,120	370,073	23%
Public Transport	90,541	86,813	-4%
Walk/Cycle	175,938	168,170	-4%
Total	567,598	625,056	10%
Attractions			
Car	428,186	510,592	19%
Public Transport	141,379	136,492	-3%
Walk/Cycle	162,107	157,520	-3%
Total	731,672	804,605	10%

Table 4 Change in Manchester Home Based Trip Productions and Attractions – Greater Manchester Proposals Scenario

	2011	2026 P1R	Difference
Productions			
Car	301,120	387,018	29%
Public Transport	90,541	99,021	9%
Walk/Cycle	175,938	180,775	3%
Total	567,598	666,814	17%
Attractions			
Car	428,186	510,768	19%
Public Transport	141,379	152,672	8%
Walk/Cycle	162,107	168,683	4%
Total	731,672	832,123	14%

4.4 The change in the number of trips to, from and with Manchester between 2011 and 2026 are shown in Table 5. Overall trips by car are forecast to increase by 20% and public transport trips by 11%. Increases for both modes are most significant in the morning and evening peaks, reflecting the increase in commuting trips arising from the forecasts increase in jobs, in particular in the Regional Centre.

Table 5 Change in Trips to/from/within Manchester – Greater Manchester Proposals Scenario

	2011	2026	Difference
Car			
Morning Peak	327,990	395,692	+21%
Inter-peak	518,525	617,716	+19%
Evening Peak	404,833	478,308	+18%
Rest of Day	193,709	235,464	+22%
TOTAL	1,445,057	1,727,181	+20%
Public Transport			
Morning Peak	114,705	127,119	+11%
Inter-peak	123,373	134,904	+9%
Evening Peak	117,126	131,100	+12%
Rest of Day	23,337	27,328	+17%
TOTAL	378,541	420,450	+11%

Impact on the Highway Network

- 4.5 The forecast morning peak vehicle flows on the network in 2026 are shown in Figure 3, with the changes in flows from 2011 shown in Figure 4. The morning peak flows are particularly significant on the motorways, radial routes into Manchester city centre and along Mancunian Way. The flow increases over the period are most significant along the same routes, particularly with traffic from the north.
- 4.6 Figure 5 shows the links in Manchester where the volume to capacity ratio exceeds 85% in 2011, and Figure 6 presents the same information in 2026. It is clear that from these two figures that a significant number of links and junctions have become closer to capacity by 2026 and this is particularly prevalent around the city centre and on the M60.



Figure 3 2026 Morning Peak Traffic Flows in Manchester - Greater Manchester Proposals Scenario



Figure 4 Change in Morning Peak Traffic Flows in Manchester between 2011 and 2026 - Greater Manchester Proposals Scenario



Figure 5 Road Links in Manchester with Volume/Capacity Greater than 85% in 2011 - Greater Manchester Proposals Scenario

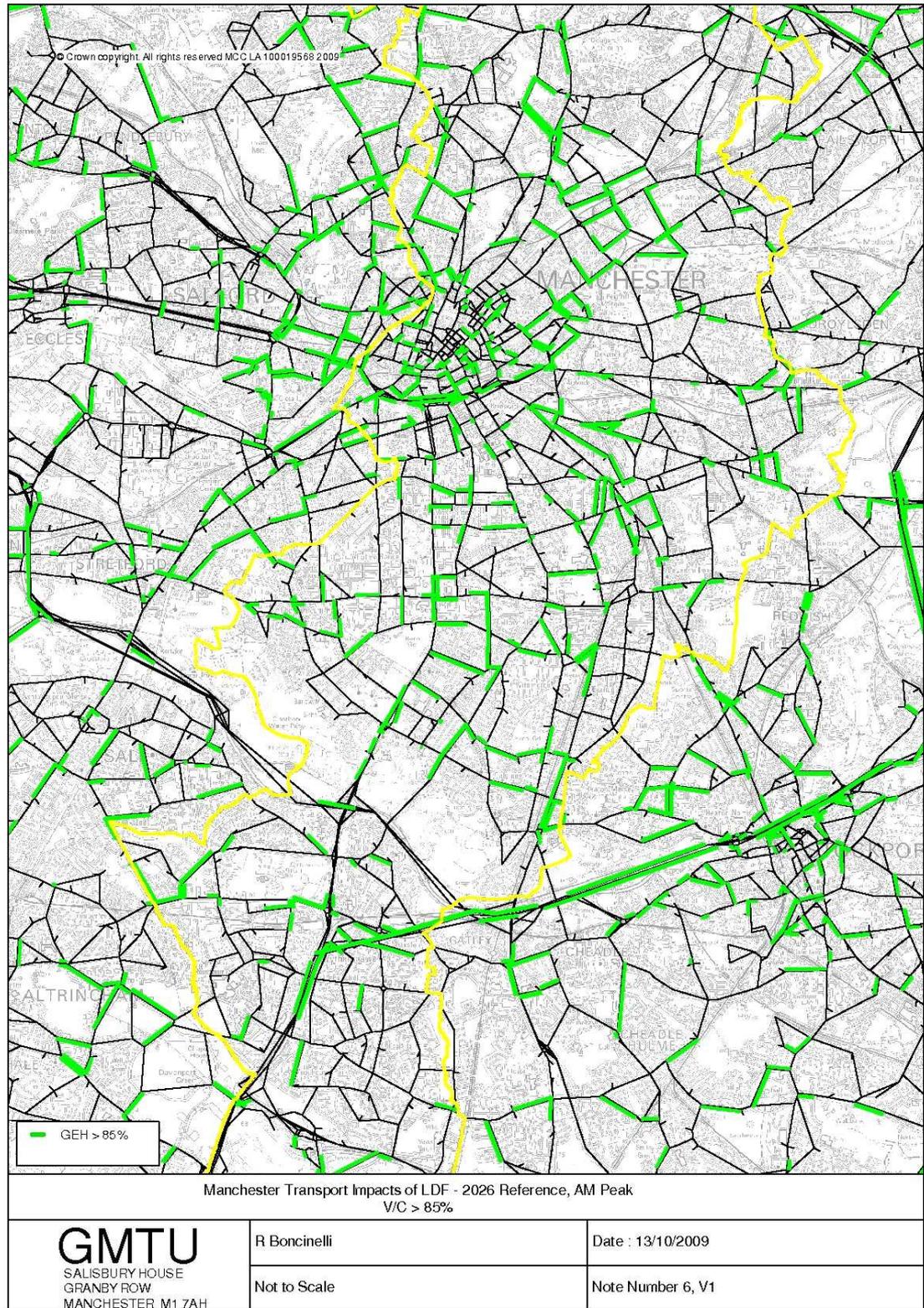


Figure 6 Road Links in Manchester with Volume/Capacity Greater than 85% in 2026 - Greater Manchester Proposals Scenario

Impact on Journey Times

- 4.7 The forecast changes in Motorway journey times within Manchester are shown in Table 6. In both the morning and evening peak the biggest increases are forecast on the M56 eastbound between junctions 7 and 5, but there are also significant increases on the M60 between junction 19 and 21 in both directions. There is a slight decrease forecast on the M56 eastbound between junctions 3 and 1 in the morning peak.
- 4.8 Table 7 shows the changes in journey times on the key radial routes into the Regional Centre. Traffic into the Regional Centre is forecast to increase by 33% in the morning peak and 28% in the evening peak. However, there are significant increases in journey times on this route in both direction in both time periods, showing that there is a noticeable impact on the journey times in the Greater Manchester Proposals Scenario.
- 4.9 The model forecasts are also suggesting significant impacts on the majority of the other key routes in Manchester, once again in both time periods and both directions. The biggest increase in journey times for the morning peak are forecast to occur on the Inner relief Route CW (east) A56 Gt Ducie St to A665 Pin Mill Brow in the morning peak and the Inner relief Road CW (west) A56 Chester Road to A56 Great Ducie St during the evening peak.
- 4.10 It is clear from these results that the increases in population and employment have significant impacts on the journey times on the vast majority of routes within the district.

Table 6 Change in Motorway Journey Times in Manchester - Greater Manchester Proposals Scenario

	Morning Peak			Evening Peak		
	2011	2026	Diff	2011	2026	Diff
M60 Clockwise						
J4 to J6	3:57	4:21	10%	3:39	3:59	9%
J19 to J21	4:39	5:44	24%	4:16	5:08	20%
M60 Anti-clockwise						
J6 to J4	3:55	4:22	12%	4:30	5:02	12%
J21 to J19	3:45	4:27	19%	4:11	4:33	9%
M56 Eastbound						
J7 to J5	5:24	6:57	29%	5:40	7:17	29%
J5 to J3	1:50	2:01	9%	1:59	2:22	19%
J3 to J1	13:41	13:01	-5%	9:23	9:46	4%
TOTAL	20:55	21:58	5%	17:02	19:25	14%
M56 Westbound						
J1 to J3	2:20	2:24	3%	2:21	2:25	3%
J3 to J5	2:25	2:48	16%	2:31	2:46	10%
J5 to J7	5:06	5:48	14%	5:15	6:03	15%
TOTAL	9:51	10:59	12%	10:07	11:14	11%

Table 7 Change in Manchester to Regional Centre Journey Times - Greater Manchester Proposals Scenario (Minutes : Seconds)

	Morning Peak			Evening Peak		
	2011	2026	Diff	2011	2026	Diff
Airport to Regional Centre						
Airport to IRR	22:04	29:17	33%	17:26	22:19	28%
Regional Centre to Airport						
IRR to Airport	19:25	23:18	20%	21:33	24:34	14%

Table 8 Change in Journey Times on Major Routes in Manchester - Greater Manchester Proposals Scenario

	Morning Peak			Evening Peak		
	2011	2026	Diff	2011	2026	Diff
Inner Relief Route CW (west)						
A56 Chester Rd to A56 Great Ducie St	8:48	12:00	36%	10:55	17:00	56%
Inner Relief Route CW (east)						
A56 Gt Ducie St to A665 Pin Mill Brow	9:10	13:53	52%	9:41	13:32	40%
Inner Relief Route CW (South)						
A665 Pin Mill Brow to A56 Chester Road	4:55	7:02	43%	4:50	5:54	22%
Inner Relief Road CW full circuit	22:53	32:55	44%	25:27	36:27	43%
Inner Relief Route ACW (South)						
A56 Chester Road to A665 Pin Mill Brow	3:55	4:54	25%	4:02	4:43	17%
Inner Relief Route ACW (east)						
A665 Pin Mill Brow to A56 Gt Ducie St	8:39	12:33	45%	11:51	15:54	34%
Inner Relief Route ACW (west)						
A56 Great Ducie St to A56 Chester Rd	7:02	10:21	47%	6:41	9:52	48%
Inner Relief Road ACW full circuit	19:36	27:47	42%	22:34	30:30	35%

A5103 M56 J3 to Manchester IRR	17:33	21:16	21%	12:32	14:12	13%
A5103 Manchester IRR to M56 J3	14:53	17:49	20%	17:10	19:06	11%
A34 M60 J3 to Manchester IRR	24:22	29:38	22%	16:02	17:08	7%
A34 Manchester IRR to M60 J3	20:54	24:42	18%	23:39	28:09	19%
A6010 A576 Leicester Rd to A62 Oldham Rd	9:04	12:59	43%	10:07	13:43	36%
A6010 A62 to A576	7:45	9:33	23%	9:52	18:15	85%
A6010 A62 Oldham Rd to A6	12:55	19:39	52%	12:17	15:19	25%
A6010 A6 to A62	10:58	12:36	15%	10:52	13:35	25%
A6010 A6 to A56	28:14	35:42	26%	27:44	33:28	21%
A6010 A56 to A6	24:57	29:56	20%	25:12	29:52	19%
A576/A665 M60 J19 TO Manchester IRR	15:10	20:01	32%	13:57	13:57	0%
A665/A576 Manchester IRR to M60 J19	12:32	14:57	19%	18:53	24:37	30%
A6 Stockpt Bdy to Manchester IRR	16:35	20:25	23%	12:56	13:00	1%
A6 Manchester IRR to Stockpt Bdy	13:22	14:20	7%	14:04	18:18	30%
A57 M60 J24 to IRR	18:13	25:29	40%	12:52	13:01	1%
A57 IRR to M60 J24	14:17	15:46	10%	26:02	35:59	38%
A635 Tameside Bdy to IRR	13:04	21:25	64%	9:17	9:32	3%
A635 IRR to Tameside Bdy	9:53	9:54	0%	11:39	13:56	20%
A62 Oldham Bdy to IRR	11:32	16:20	42%	10:05	10:17	2%
A62 IRR to Oldham Bdy	10:08	10:33	4%	11:01	14:09	28%
A664 M60 J20 to IRR	18:14	24:30	34%	12:08	12:48	5%
A664 IRR to M60 J20	13:49	16:44	21%	22:49	29:06	28%

Impact on Public Transport

4.11 The forecast changes in public transport boardings and alightings in Manchester are shown in Table 9. There are forecast to be increases in public transport patronage in each of the time periods, but there is a clear shift away from bus towards rail and tram. A number of factors will be contributing to this including increases in the value of time, increased congestion on the road network which will impact on bus journey times, and the expansions to the Metrolink network. This switch away from bus is enough that, despite the increases in public transport patronage, bus patronage is actually declining. The increase in rail and tram patronage will have an effect on crowding levels, particularly on routes that are already experiencing overcrowding.

Table 9 Change in Manchester Public Transport Boardings and Alightings– Greater Manchester Proposals Scenario

	Boardings			Alightings		
	2011	2026	Diff	2011	2026	Diff
Morning Peak						
Bus	21,820	20,287	-7%	26,878	25,636	-5%
Rail	3,390	3,848	14%	10,447	11,647	12%
Tram	5,213	9,545	83%	8,823	13,415	52%
TOTAL	30,423	33,681	11%	46,147	50,698	10%
Inter-peak						
Bus	13,503	12,931	-4%	13,951	13,208	-5%
Rail	2,342	2,824	21%	1,871	2,172	16%
Tram	2,945	5,269	79%	3,485	5,934	70%
TOTAL	18,790	21,024	12%	19,307	21,313	10%
Evening Peak						
Bus	26,319	26,929	2%	21,051	20,779	-1%
Rail	7,547	8,732	16%	3,036	3,374	11%
Tram	7,554	11,074	47%	5,551	9,215	66%
TOTAL	41,420	46,734	13%	29,638	33,368	13%

Impact on Environmental Indicators

4.12 The forecast change in the environmental indicators in Manchester is shown in Table 10. The model forecasts have included the Department for Transport's guidance that fuel efficiency will improve over time and those engine standards for emissions will continue to improve. This means that, in spite of increases in traffic levels, NO_x emissions are forecast to reduce by 18.8% over the period 2011 to 2026. However, PM₁₀ and CO₂ emissions are forecast to continue increasing, the CO₂ increase being by 14%.

Table 10 Change in Environmental Indicators in Manchester – Greater Manchester Proposals Scenario

	2011	2026	Difference
NO _x	1,538	1,248	-19%
PM ₁₀	181	195	+7%
CO ₂	153,878	179,044	+16%

5 Summary

- 5.1 In Manchester population is forecast to increase by 17% and employment by 11%, with the majority of the growth in both population and employment concentrated on the Regional Centre and the area around it. The only other significant area of employment growth is at the airport, and population in the southern part of the district decreases for a number of zones.
- 5.2 There is forecast to be an increase in the overall level of trip making of 17% for trip productions, and 14% for trip attractions, which is consistent with the changes in population and employment. All of the modes have seen increases in the overall level of trip making, but with car increasing at a higher rate meaning that the car mode share will be increasing over time. The concentration of population and employment in the Regional Centre, and the attractiveness of this area for travel by public transport, means that public transport trips increase despite the changes in car ownership, value of time and the relative costs of travel by the different modes.
- 5.2.1 A significant number of links and junctions are forecast to become closer to capacity over the period 2011 and 2026, particularly in and around the Regional Centre. This impact is also seen in the form of increases in journey times on all of the key routes in the district, with the vast majority of these increases being significant. In particular the concentration of population and employment in the Regional Centre is having a significant impact on journey times to this area.
- 5.3 Public transport boardings and alightings increase over the period, with these increases occurring in each of the time periods. There is a clear shift away from bus to rail and tram as a result of the congestion on the highway network, increasing values of time and the expansion of the Metrolink network. The increase of rail and tram patronage will have implications for overcrowding during peak periods, particularly on services which are already experiencing overcrowding.

- 5.4 The model inputs have assumed that fuel efficiency of vehicles is improving through time, and that engine standards for emissions continue to increase. Therefore NO_x emissions are forecast to reduce by 18.8% between 2011 and 2026 even though traffic levels are increasing. PM₁₀ and CO₂ emission are forecast to increase.